



AIT930

Servo Inclinometer with taut-band suspension, x and y measurements

- ▣ Ranges $\pm 1^\circ$ to $\pm 90^\circ$
- ▣ Non-Linearity 0.02 % FRO to 0.08 % FRO, depending on range
- ▣ Excitation Voltage ± 12 to ± 18 VDC
- ▣ Full Range Output ± 5 VDC



The AIT935 series is a high precision closed loop gravity referenced servo inclinometer. It is designed for use where overall space is limited. The unit can be stacked to provide dual axis x and y measurements. Models are available in a wide variety of angle ranges. Solder pin terminations are standard.

AIT935 series inclinometers carry the tradition of a long and successful market history for servo inclinometers marketed under the Schaevitz® brand.

Applications

- ▣ Bore Hole mapping
- ▣ Structural Health Monitoring
- ▣ Continuous Casting Mold Alignment
- ▣ Railway Maintenance Equipment
- ▣ Mobile and Stationary Antenna Aiming

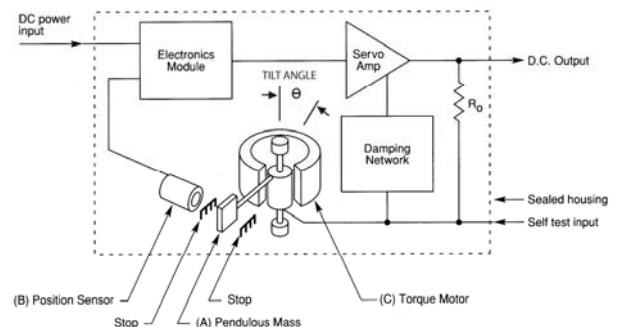
More Features

- ▣ Fully self contained and compact – connect to a DC power source and a readout or control device for a complete operating system
- ▣ Extremely rugged, fluid filled, withstands 1500g shock
- ▣ Extended pins with chamfered housing edge for ease of soldering
- ▣ Laser marked part and serial number
- ▣ Stackable for x and y measurements

Principles of Operation

The Schaevitz inclinometer is a precision inertial instrument (accelerometer) that responds to the normal component of the gravitational acceleration vector (gravity). Pendulous mass (A) is attached to the torsionally suspended armature of torque motor (C). Stops on either side of the mass (A) limit its travel when the device is not powered. When the power is applied, the pendulous mass (A) automatically moves to its “zero” position.

As the inclinometer is tilted through some angle (θ) along its sensitive axis, mass (A) tries to move in the direction of tilt as a result of a force (torque) applied to the mass by normal component of gravitation acceleration. The resulting change in position of mass (A) is detected by position sensor (B), which produces an error signal output. This DC error signal is fed to a servo amplifier whose output is a DC current coupled to the armature of torque motor (C) through R_0 . Current applied to the torque motor armature produces a torque that opposes the gravitational force acting on the mass (A) and moves it back toward its original position. When the torque developed by the servo system output current just balances the torque developed by the gravity vector component acting on pendulous mass (A), the mass no longer moves and is at rest almost in its original position, being displaced by some minute amount that produces the required error signal from position sensor (B). Because the gravity component's force is exactly equal in magnitude to the torque motor's output, which, in turn, is directly proportional to the applied current, this current, passed through R_0 generates a voltage across R_0 that is proportional to the normal component of the gravity vector. The normal component is the product of the essentially constant gravity vector times the sine of angle (θ). Therefore, the output voltage, E_0 x across R_0 is proportional to the sine of the tilt angle θ .



Specifications

Performance by Range at 20 °C

Range		±1°	±3°	±14.5°	±30°	±90°
Excitation voltage	VDC	±12 to ±18				
Current consumption	mA (nom)	±15				
Full range output (FRO) (see note 1)	VDC	±5				
Output standardisation	% FRO	±1				
Output impedance	Ω (max)	10				
Output noise	V rms (max)	0.002				
Non-linearity (see note 2)	% FRO	0.08	0.05	0.02	0.02	0.05
Non-repeatability	% FRO	0.02	0.01	0.002	0.001	0.0005
Resolution	arc seconds	0.1	0.2	1.0	2.0	4.0
Frequency -3 dB	Hz	10	15	30	40	55
Sensitive axis to case misalignment	deg (max)	±0.15	±0.15	±0.25	±0.50	±1.0
Cross axis sensitivity (see note 3)	% FRO	0.1				
Zero offset (see note 4)	VDC	±0.08	±0.04	±0.04	±0.02	±0.02
Thermal zero shift	% FRO/°C	±0.05	±0.03	±0.01	±0.005	±0.003
Thermal sensitivity	% reading/°C	±0.05	±0.03	±0.01	±0.006	±0.006

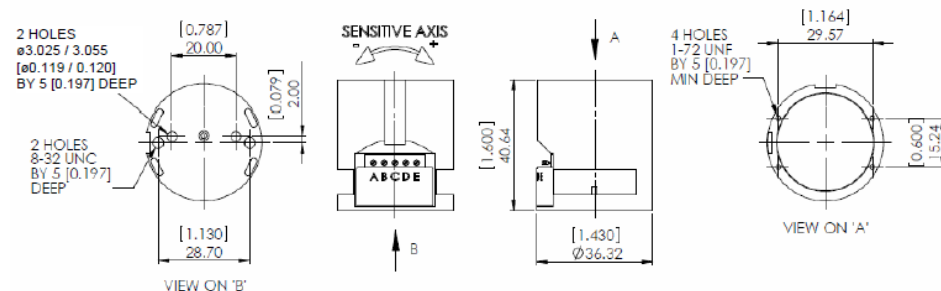
Environmental Characteristics

Temperature range – operating	-18 ... +70 °C (0 ... 160 °F)
Temperature range - storage	-40 ... +70 °C (-40 ... 160 °F)
Constant acceleration overload	50 g
Shock survival	1500 g, 0.5 ms, ½ sine
Vibration endurance	35 g rms, 20 Hz to 2000 Hz sinusoidal
Environmental sealing	IP65

Notes:

1. Full Range Output is defined as the full angular excursion from positive to negative, i.e. ±90° = 180°
2. Non-linearity is determined by the method of least squares.
3. Cross-axis Sensitivity is the output of unit when tilted to full range angle in cross-axis.
4. Zero offset is specified under static conditions with no vibration inputs.

Dimensions



each other

Dimensions in mm, values in brackets in inch, approx. values.

These drawings are for information only and not intended for construction purpose. Please ask for detailed drawings.

Note: Slots and 1-72 tapped holes permit piggyback mounting two units at 90° to

Electrical Connections

Pin A	+12 VDC to +18 VDC
Pin B	0 V
Pin C	-12 VDC to -18 VDC
Pin D	Output
Pin E	Self test

Please note:

The pin connections of new AIT930 differ from the connections of prior model AIT430!

Ordering Information

Specify model type with appropriate range e.g.

AIT935-0001-14.5 is a standard inclinometer with a range of ±14.5°

Due to continual product development, ALTHEN and partners reserve the right to vary the foregoing details without prior notice.